

SECTION 1

INTRODUCTION TO SCIENCE

INDEX

Kits "First steps into science" page. 10

Kits "Scientific paths" page. 15



FIRST STEPS INTO SCIENCE

FOR PRIMARY AND SECONDARY SCHOOL

The kits "First steps into science" are suitable for the students of primary and secondary school:

- the experiments aren't dangerous for the students;
- the materials used to create the components aren't toxic;
- no net tension is needed to use them.

The experiments are easy to be performed and they are suitable for students. The experiments have been performed in our laboratories by a competent staff, this ensures the good development of them.

The aim is to give students the possibility to approach science field observing elementary phenomena, catching their interdisciplinary aspects, as for the series of experiments Sun - Energy - Photosynthesis, etc.

The steps suggested for each experiment are easy to be checked and stimulate the curiosity of the students towards further questions and elaborations. The experiments are easy but not superficial, they help students to understand subjects which seem to be complicated from a theoretical point of view. The analysis of natural phenomena shouldn't be only explained by the teacher but it has to be performed directly by the students through several experiments. It is important to say that these kits are cheap but they present a high teaching efficiency.

Each experiment is illustrated in the english manual together with a list of items to be used and the specific steps to follow to perform the experiment.

The items of each kit are in a box as shown in the picture.

P101 AIR PROPERTIES

CONTENTS

1. What is the atmosphere?
2. The air exists
3. The air weighs
4. The atmospheric pressure
5. The barometers
6. The air contains oxygen
7. The air contains carbon dioxide
8. The air contains steam
9. When the air warms up
10. The winds
11. The moving air
12. The air to fly
13. The air pollution
14. The greenhouse effect

SUPPLIED EQUIPMENT

- | | |
|-------------------------------|-------------------------|
| 5 Drinking straws | 1 Funnel with plug |
| 1 Suction cap | 1 Compass |
| 1 Plastic tube | 1 Plastic bottle, 100cc |
| 1 Rubber ball | 1 Plastic bag |
| 5 Elastics | 3 Aluminium discs |
| 1 Dropper | 1 Thermometer, 0-50°C |
| 1 Transparent tubes with plug | 1 Fan |
| 3 Candles | 1 Bottle of vaseline |
| 1 Magnification lens | 1 Beaker, 250 ml |
| 1 Bottle of barite water | 1 Test tube, 16x160mm |
| 1 Bottle of methylene blue | 1 Test tubes, 20x200mm |
| 1 Ping pong ball with thread | 1 User guide |

P101



P102 WATER PROPERTIES

CONTENTS

1. Water: a precious good
2. Water as a liquid
3. How to measure the volume of water
4. How to measure the weight of water
5. Water as a chemical compound
6. The evaporation of the liquids
7. Water evaporation
8. The condensation of steam
9. Water as a solid: the ice
10. The water cycle
11. The specific weight of solid bodies
12. The specific weight of water
13. Archimede's principle
14. When does a body float in the water?
15. The ice cycle
16. Water pollution
17. Water: a precious good to be saved

SUPPLIED EQUIPMENT

- | | |
|---------------------------------|--------------------------|
| 1 Rope skein | 1 Set of 3 samples |
| 1 Rod with hook | 5 Filter paper discs |
| 1 Scale plate | 1 Tripod support |
| 1 Double Archimede's cylinder | 1 Universal pH indicator |
| 1 Bottle of denaturated alcohol | 2 100 ml beakers |
| 1 Spring scale | 1 250 ml beaker |
| 1 Metallic rod | 2 Watch glasses |
| 1 Dropper | 1 Flask, 100 ml |
| 1 Rain gauge | 1 User guide |
| 1 Aluminum foil | |
| 1 Plasticine | |

P102



P103 THE FORCES

CONTENTS

1. The forces
2. Forces in action
3. The weight is a force
4. The elasticity
5. The spring scale
6. Other types of force
7. A strange addition: how to sum the forces
8. The addition of parallel forces
9. The friction forces
10. The centre of gravity

SUPPLIED EQUIPMENT

- | | |
|------------------------------------|----------------------------------|
| 1 Nylon rope | 1 Coil spring |
| 1 Figure for the centre of gravity | 1 Bar for levers without a pivot |
| 1 Bar with hook | 1 Small PVC rod |
| 1 Series of ten 50g weights | 2 Threaded pivots |
| 1 Linear ruler | 1 Threaded pivot, 2 parts |
| 1 Spring scale | 3 M 4 wing nuts |
| 1 Metallic rod | 1 M 3.5 wing nuts |
| 1 PVC roll | 1 Aluminium tripod support |
| 1 Protractor | 1 Rubber marble |
| 1 Linear magnet | 1 User guide |

P103



P104 LEVERS, PULLEYS AND INCLINED PLANE

CONTENTS

1. The spring scale
2. How to use smartly our strength
3. The equilibrium of a rod
4. The levers
5. Type I lever
6. Type II lever
7. Type III lever
8. The pulleys
9. The fixed pulley
10. The movable pulley
11. Block and tackle
12. The inclined plane

SUPPLIED EQUIPMENT

- | | |
|-----------------------------|--------------------------------------|
| 1 2m nylon rope | 1 Metallic rod with two knurled ends |
| 1 Rod with hook | 1 Rod for levers |
| 2 Double terminals for rods | 1 Inclined plane |
| 1 Pulley | 1 2-side threaded pivot |
| 1 Series of ten 50g weights | 1 Wing nut M 4 |
| 1 Roller with hook | 1 Wing nut M 3.5 |
| 1 30cm Ruler | 1 Tripod base |
| 2 Pulleys with hooks | 1 User guide |
| 1 Spring scale | |

P104



P105 THE THREE STATES OF MATTER AND THE THERMAL EXPANSION

CONTENTS

1. The alcohol burner
2. The matter
3. The solid state
4. The liquid state
5. The gaseous state
6. State changes
7. Heat and temperature
8. Fusion and Solidification
9. Evaporation
10. Boiling
11. Condensation
12. The thermal expansion of solids
13. The thermal expansion of liquids
14. The thermal expansion of gases

SUPPLIED EQUIPMENT

- | | |
|-------------------------------|----------------------------|
| 1 200 mm glass tube with plug | 1 Shaker |
| 1 Bent glass tube with plug | 1 Small iron cube |
| 1 125 cc alcohol bottle | 1 Funnel |
| 1 Rubber balloon | 1 Burner net |
| 1 Burner tripod | 1 Thermometer -10 +110 °C |
| 5 Elastic band | 1 250 cc beaker |
| 1 Dropper | 1 100 cc glass flask |
| 1 Alcohol burner | 1 16 x 160 glass test tube |
| 1 Cubic dilatometer | 1 Watch glass |
| | 1 User guide |

P105



P106 LIGHT, SHADOW & IMAGES

CONTENTS

1. The light source
2. Why do we see objects?
3. The light rays
4. The law of enlightenment
5. Shadows
6. The reflection of light
7. The images on plane mirrors
8. The refraction of light
9. The lenses
10. The images in the converging lenses
11. The images in the diverging lenses
12. The slide projector

SUPPLIED EQUIPMENT

- | | |
|--------------------------------|--------------------------------|
| 1 Ruler | 1 Diaphragm with three slots |
| 1 Slide | 1 White screen |
| 1 Converging lens | 1 Diaphragm with 1 slot |
| 1 Diverging lens | 1 Plane mirror with goniometer |
| 1 Battery holder | 1 Diaphragm with arrow |
| 1 Light source | 1 Plane mirror |
| 1 Sphere with vertical support | 1 Diaphragm with square hold |
| 1 Condenser lens with support | 1 Clip |
| 1 Diaphragm holder | 1 Lens holder |
| | 1 100 ml beaker basin |
| | 1 User guide |

P106



FIRST STEPS INTO SCIENCE

P108 STATIC ELECTRICITY

P108

CONTENTS

1. The electrification
2. Protons and electrons
3. The electric forces
4. The electrostatic induction
5. The double electric pendulum
6. Conductors and insulators
7. The wimshurst electrostatic machine
8. Bolts and lightning
9. The power of sharp points
10. The electric whirl
11. The "dance of spheres"
12. The electric plume

SUPPLIED EQUIPMENT

- | | | |
|-------------------------------|-------------------------------------|--------------------------|
| 1 Candle | 1 Wimshurst electrostatic machine | 1 Electric whirl |
| 2 Cables with crocodile clips | 1 Support for electric whirl | 1 Aluminium disc |
| 1 Pair of balls for pendulum | 1 Conductor with bent tip | 1 Conical electric board |
| 1 Pair of rags | 1 Device for the "dance of spheres" | 2 PVC rods |
| 1 Support with hook | 1 Electric plume | 1 Glass rod |
| | 1 Clip with rope | 1 User guide |
| | 1 Iron rod | |



P109



P109 ELECTRIC CURRENT

CONTENTS

1. To know the electricity
2. The electrification
3. Protons and electrons
4. The moving electricity
5. The batteries
6. The voltaic pile
7. The potential difference
8. The voltmeter
9. The electric circuit
10. Conductors and insulators
11. The intensity of the electric current
12. The ammeter
13. The electrical resistance
14. The electric power
15. The conversion of electric power into heat
16. The domestic electric system

SUPPLIED EQUIPMENT

- | | | |
|---------------------------|-----------------------------|----------------------------------|
| 2 Connecting cables 30 cm | 1 Knife switch | 1 Battery holder, 4 places |
| 3 Connecting cables 60 cm | 1 Lamp holder with lamp | 1 Pair of electrodes for battery |
| 1 Black crocodile clip | 1 Double capacity ammeter | 1 User guide |
| 1 Red crocodile clip | 1 Double capacity voltmeter | |
| | 1 Electric calorimeter | |

P110 MAGNETS AND ELECTROMAGNETS

P110

CONTENTS

1. The magnets
2. The magnetic poles
3. The materials and the magnets
4. The magnetic needle
5. Earth magnetism
6. The compass
7. Magnetic forces
8. Magnetic levitation
9. Magnetic induction
10. The electric current's magnetic effect
11. The electromagnet
12. The electric alarm

SUPPLIED EQUIPMENT

- | | |
|----------------------------------|------------------------------|
| 2 60cm cables | 10 Nails |
| 1 Electric alarm | 1 Coil with support |
| 1 Magnetic needle | 1 Nucleus for electromagnets |
| 1 Linear magnet | 1 Compass |
| 1 Battery holder | 1 Protractor |
| 1 Device for magnetic levitation | 1 User guide |



P111

P111 THE PROPER MOTION OF THE SUN

CONTENTS

1. Light sources and illuminated bodies
2. The light source provided
3. The shadows
4. The light propagates in a straight line
5. The shadow's length
6. Geometry
7. When the light source changes height and position
8. How we see the sun moving from the earth
9. How the sun's height varies during a day
10. The time zones
11. The daylight saving time
12. How the sun's height varies in different days
13. Solstice and equinox
14. The sun's motion is only apparent
15. The earth's revolution around the sun
16. A consequence of the earth's rotation: day and night
17. A consequence of the polar axis' inclination
18. The astronomical seasons
19. The earth's warming
20. The earth's satellite: the moon
21. The moon phases
22. The lunar eclipse
23. The solar eclipse

SUPPLIED EQUIPMENT

- | | |
|--------------------------|------------------------|
| 1 Rope | 14-slot battery holder |
| 3 Pins | 1 Light source |
| 1 Wooden spheres | 1 Globe with support |
| 1 Linear rod | 1 Board with gnomon |
| 1 Board with square hole | 1 Compass |
| | 1 Protractor |
| | 1 User guide |



P112 THE ENERGY FOR LIFE

P112

CONTENTS

- The chemical elements
- The atoms
- The molecules
- The cohesion force
- The cell
- What is biology?
- The water
- The watery solutions
- The osmosis
- The mineral salts
- The roots
- How roots absorb water and mineral salts from the soil
- The trunk
- The capillarity
- The leaves' transpiration
- The living beings and their nutrition
- The chlorophyll
- The photosynthesis
- The cell respiration in the plants
- The starch: a reserve substance of plants
- The food chain
- To eat for living
- The starch in the food
- The digestion of starch
- How fat is recognized
- The digestion of fat
- How proteins are recognized
- The digestion of proteins
- The energy and the animals' life
- The combustion
- The respiration



SUPPLIED EQUIPMENT

- | | | | | |
|----------------------------------|-----------------------------------|--------------------------------|-----------------------------------|-----------------------|
| 1 Device for capillaries | 1 Ethyl alcohol | 2 Petri capsules 80mm diameter | 1 Starch | 1 Trunk section |
| 1 Dropper | 1 Osmometer | 1 Graduated cylinder 100mm | 1 Biuret | 2 60mm Petri Capsules |
| 2 Candles | 10 Discs filter paper | 1 Plastic bag 25x35cm | 1 Vaseline | 7 Test-tubes |
| 1 Magnifying lens | 1 Clamp | 1 Elastic band | 1 Sudan III reagent | 1 Aluminium disc |
| 1 10% solution hydrochloric acid | 1 Scalpel | 2 Plastic bags 12x21cm | 1 Test-tube holder | 1 User guide |
| 1 Distilled water | 1 Paddle with knife | 1 Small bag with seeds | 1 Table of plant and animal cells | |
| 1 Tin foil sheet | 1 Potassium permanganate solution | 2 Culture dishes | 1 100mm beaker | |
| | 1 Funnel | 1 Lugol solution | 1 250mm beaker | |

P113

P113 A JOURNEY IN THE WORLD OF VISION

CONTENTS

- The light sources and the enlightened bodies
- The propagation of light
- Light carries energy
- The eye: a photoreceptor
- The lenses
- The eye as an optical system
- Eye defects and their correction
- The resolving power of the eye and the visual acuity
- The eye-brain system
- The persistence of the images on the retina
- Temporal color synthesis
- Spatial color synthesis
- Binoocular vision
- The sense of depth
- Stereoscopic vision
- Visual field
- The optical illusions
- The magnifying lens

SUPPLIED EQUIPMENT

- | | | |
|------------------------|--|-----------------------|
| 1 Manual Newton disc | 1 Magnifying lens 2X - 4X | 1 Set of tables |
| 1 Stereoscopic glasses | 1 90x90mm Plate with hole for propagation of light | 1 Stereoscopic Figure |
| 1 Didactic Focometer | 1 Vision tube | 1 User guide |

P114 THE EAR AND THE HEARING

P114

CONTENTS

- The harmonic motion
- Graphical representation of the harmonic motion
- When we hear a sound
- Why do we hear sounds?
- The acoustic waves
- How the acoustic waves turn into sounds
- The ear: a receiver of acoustic waves
- The ear-brain system
- The audibility limits
- The sounds' distinctive features
- The auditory system's sensitivity
- How to improve the auditory sensitivity
- The stereophonic sound
- Echo, reverberation and peal
- Care of the auditory system

SUPPLIED EQUIPMENT

- | | |
|---------------------------------|---|
| 1 Cork | 1 Steel foil |
| 1 Fibreglass linear rod | 2 20x20 Anti-acoustic panel |
| 1 Tuning fork with small hammer | 1 Wooden sphere with thread |
| 1 Stethoscope | 1 Graduated beaker with PP 250 ml scale |
| 1 Ultrasound whistle | 1 User guide |
| 1 Xylophone | |



P115

P115 TOUCH, OLFACTION AND TASTE

CONTENTS

THE TOUCH

- The skin
- The skin's sensitivity
- The touch's stimuli
- The pressure's stimuli
- The pain's stimuli
- Temperature and heat
- The body temperature
- The thermal stimuli
- To see with your touch
- The fingerprints
- The skin's hygiene

THE OLFACTION

- How is matter made
- The matter's aggregation stages
- Stage changes
- The nose: the organ of olfaction
- How smells are detected
- How smells are identified
- The addiction to smells
- The nose's hygiene

THE TASTE

- The tongue: the taste's organ
- How tastes are detected
- The four basic tastes
- Taste and olfaction
- Taste and eyesight
- Good and bad tastes

SUPPLIED EQUIPMENT

- | | |
|----------------------------|---|
| 4 Dropper with rubber bulb | 1 Set of tables |
| 1 Ink pad | 1 Digital Thermometer |
| 1 Set for smells | 1 Graduated beaker with PP 250 ml scale |
| 1 Set for tastes | 3 Plastic spoon |
| 1 Set of different objects | 1 Petri dish |
| | 4 Set of tables |
| | 1 User guide |



P116 RENEWABLE ENERGY

P116



CONTENTS

1. The energy
2. The energetic problem
3. The forces
4. Forces at work
5. The energy and its forms
6. The potential energy
7. The kinetic energy
8. Conservation and energy transformation
9. Renewable and non-renewable energies
10. Stocks of coal and oil: resources that are running out and the need for alternative energy.
11. Hydraulic power
12. Wind power
13. Heat energy
14. Solar power

SUPPLIED EQUIPMENT

1	Cart	1	Glass flask with narrow neck 100cc
1	2m nylon rope.	1	Thermometer 0°-50 °C
1	Rubber ball 27mm diameter	1	Rubber plug 5.5 with hole
1	Mass 25g with hook	1	Manual motor-dynamo
1	250 ml low-shape beaker	2	Pair of electrodes per cell
2	Candle	1	DC double-scale voltmeter
1	Candle holder	2	Connection cable 60 cm
1	Breath-enabled energy device	1	Connection cable 30 cm
1	Panel with LED	2	Red crocodile clip
1	Photovoltaic panel with support	2	Black crocodile clip
		1	User Guide



The most effective way to introduce the world of Science to young people is to teach them concepts representing the base for further investigation on the subject; a wider research could take place further on. There are some fields of knowledge regarding our daily life we perceive as a whole; they house several phenomena. For example, the air we breath is not only necessary to life, but it is also the seat of meteorological, sound and electrical phenomena, as well as many others, involving different scientific fields.

The same goes for water, energy, light and many other things.

The first approach to the study of these subjects must feature a vision of the subject as a whole, through an experimental and interdisciplinary course. This new series of kits has been designed to offer teachers a valid educational instrument to deal with these phenomena in a unitary way, through a series of simple but effective experiments.

5501 "THE AIR"

CONTENTS

1. What's the atmosphere?
2. The air does exist
3. The air does weigh
4. Atmospheric pressure
5. Barometers
6. Compressed air and rarefied air
7. Air composition
8. Air for life
9. When air warms up
10. Winds
11. Air on the move
12. Air to fly
13. Air and sounds
14. Pollution in the air
15. Greenhouse effect

30 EXPERIMENTS



5501

SUPPLIED EQUIPMENT

1 Conical flask	1 Stand with rod	1 Diapason with box	1 Plastic bag
1 Skein of thread	1 Clamp	6 Candles	1 Fan
2 Ping-pong balls	1 100ml syringe with tap	3 Candle holders	1 Grass seeds packaging
1 Pinchers with clamp	1 Silicone grease packaging	1 Magnifying glass	1 Vaseline bottle
1 Cork	1 Propeller model	1 Barile water bottle	1 100ml beaker
5 Drinking straw	1 Wind indicator	1 Methylene blue	1 400ml beaker
1 Suction beaker	1 Baloon	1 Ball with thread	2 20x200mm test tubes
1 Plastic tube	1 Dropper	5 Absorbent paper disks	1 Experiment Guide
1 Rubber stopper with hole	1 Thermometer for environment	1 Tweezers	1 Small case
	1 Transparent tube with stopper	1 Funnel	

5502 THE WATER

CONTENTS

1. Water: a precious gift
2. Temperature and heat
3. Water in the liquid state
4. Water evaporation
5. Boiling water
6. Steam codensation
7. Water in its solid state: ice
8. Water cycle
9. Water for life
10. Specific weight
11. Water specific weight
12. Archimede's principle
13. When does a body float on water?
14. Different kinds of water
15. Water pollution
16. Water: a precious gift to be saved

33 EXPERIMENTS



5502

SUPPLIED EQUIPMENT

1 Metal rod	1 Syringe with stopper and tap	1 Terracotta pot	1 Humus bottle
1 Rod with hook	1 Scale weighing pan	1 Base for pot	1 Universal pH indicator
1 Rod with clip	1 Archimede's double cylinder	1 Plasticine packaging	1 Thermometer
1 100 ml flask	1 Denaturated alcohol bottle	1 Set of 4 samples	2 100ml beaker
1 Skein of thread	2 50g weights	1 Rod with disk	1 400ml beaker
1 Glass tube with stopper	1 Spring scale	1 Stirring rod	1 Misuring cylinder
1 Curved glass tube with stopper	6 Small circular rubber bands	5 Filter-paper disks	3 Test tubes
1 Base for rod	1 Dropper	1 Fertilizer bottle	2 Whatch glasses
1 Clamp	1 Hygroscope	1 Rubber stopper with hole	1 Capillary glass tube
1 250 ml conical flask	1 Funnel with stopper	1 Spoon	1 Experimet Guide
	1 Distilled water bottle	1 Pots for cultivation	1 Small case
	1 Aluminium foil sheet	1 Sandbottle	

SCIENTIFIC PATHS

5503



5503 "THE ENERGY"

CONTENTS

1. The energetic problem
2. The forces
3. Forces at work
4. The energy
5. The greatest source of energy: the Sun
6. The Food Chain
7. Energy content of foods
8. Heat energy
9. Gravity energy
10. Elastic energy
11. Kinetic energy
12. The electricity
13. The electric circuit
14. Electric energy
15. How to produce electric power
16. House electric system
17. The transformation of energy: the productivity
18. Energy saving

30 EXPERIMENTS

SUPPLIED EQUIPMENT

1 Metal rod	1 Rubber ball	1 6 volt light bulb	1 1.5V light bulb
1 Rod with hook	1 Coil spring	3 Electric threads	1 Copper electrode
1 250 ml conical flask	1 Small spring cannon	1 Aluminium foil sheet	1 Zinc electrode
1 Skein of thread	1 50g weight	1 Tester	1 Battery holder
1 Clip with thread	1 10g weight	1 Switch	1 Acid solution
1 Table clamp	1 25g weight	1 Lamp socket	1 400ml beaker
1 Trolley	2 Candles	1 Alternator model	1 Experiment Guide
1 Pulley with rope	1 Candle holders	2 Rags	1 Small case
1 Clamp	1 Plexiglass rod	1 Engine with propeller	
	2 PVC rods	1 Solar panel	

5504

5504 "LIGHT, COLOURS AND VISION"



CONTENTS

1. Knowing light
2. Light sources and illuminated bodies
3. Light transports energy
4. Do rays of light really exist?
5. Two characteristic of light
6. Lighting
7. Light reflection
8. Light refraction
9. Total reflection
10. Total reflection prisms and optical fibres
11. Physical nature of light
12. Colours
13. White light
14. Light filters
15. The colours of the object
16. Additive colour synthesis
17. Subtractive colour synthesis
18. The colour of the sky and of the sun
19. Lenses
20. Pictures through lenses
21. The eye and the sight
22. Eyes' defects
23. Binocular fusion and dominant eye
24. The sense of depth
25. Optical illusions

35 EXPERIMENTS

SUPPLIED EQUIPMENT

1 Linear ruler	1 Set of 3 secondary colour filters	1 Vision tube	1 Stereoscopic figure
1 Dropper	1 Laser device	1 Optical projector	1 Experiment Guide
1 Transparent slide	1 Diaphragm with circular hole	1 Diaphragm holder	1 Small case
1 Diaphragm with square hole	1 Optical fibre	1 White screen	
5 Candles	1 Optical prism with stand	1 Converging lens	
1 Candle holder	1 Stereoscopic glasses	1 Diverging lens	
1 Flat mirror	1 Colour composition device	1 Sphere with stand	
1 Pocket-size Spectroscope	2 Small cables	1 Basin	
1 Set of 3 primary colour filters	1 Solar panel with engine	1 100ml beaker	
	1 Battery holder	1 Colours chart	

5505 PHYSICS OF SOUND

5505

CONTENTS

1. When do we hear a sound?
2. Oscillations
3. Limits of audibility
4. The height of a sound
5. The intensity of a sound
6. Graphic representation of an oscillation
7. Why do we hear sounds
8. Acoustic waves
9. How acoustic waves turn into sounds
10. How to increase the intensity of sounds
11. Acoustic waves reflection
12. Acoustic waves interference
13. Stationary waves
14. The sonometer
15. The resonance
16. String instruments
17. Wind Instruments
18. The tone

26 EXPERIMENTS



SUPPLIED EQUIPMENT

- | | | |
|--|---|--|
| <ul style="list-style-type: none"> 1 Metal rod 1 Metal rod with hook 1 Cork 1 Clip pinchers 1 Double clamp 1 Glass cylinder 2 Bases for rods 1 Resonance box | <ul style="list-style-type: none"> 1 Sonometer 1 Set of 8 tuning forks 1 Couple of 440 Hz tuning forks 1 Vibrant foil 1 Stethoscope model 1 Stethoscope 1 Electromechanical vibrator 1 Elastic cord | <ul style="list-style-type: none"> 1 Pivot with star knob 1 Cursor flute 1 Power unit 1 Sphere with thread 1 Beaker 1 Experiment Guide 1 Small case |
|--|---|--|

5506 HOW TO MEASURE TIME PASSING BY

5506

CONTENTS

1. Introduction
2. Time in science
3. The movement
4. The speed
5. Cyclical movements
6. The period of the pendulum
7. The phenomenon of elasticity
8. Elastic pendulum
9. A pendulum clock
10. Cyclic motions of nature
11. Earth's shape
12. Poles, meridians and parallels
13. Latitude and longitude
14. Apparent motion of Sun
15. Motion of revolution of the Earth
16. Sidereal day and solar day
17. Time in different parts of the Earth
18. The International Date Line
19. The gnomon
20. The sundial
21. Daylight Saving Time
22. The calendar
23. The Moon, Earth's satellite
24. The Month
25. Moon Phases
26. Moon Eclipse
27. Sun eclipse
28. The age of trees

30 EXPERIMENTS



SUPPLIED EQUIPMENT

- | | | | |
|--|--|--|--|
| <ul style="list-style-type: none"> 1 Metal rod 1 Skein of thread 1 Pendulum stand 1 Double clamp 1 Rubber ball 1 Coil spring diam. 27 mm 1 Linear ruler 6 25 g weights with hook 1 Aluminium sphere | <ul style="list-style-type: none"> 1 Wood sphere 1 Base for rod 1 Led projector 1 Laser with power-unit 1 Globe stand 1 Vision tube 1 Straight pivot 1 Sun rays model 1 Universal stand 1 Parking disk | <ul style="list-style-type: none"> 1 Arrow with clip 1 Series of 4 cards 1 23° inclined pivot 1 Arm with the Moon 1 Moon phase disk 1 Couple of pins 1 Sundial model 1 Small board with two pawls 1 Laser collimator 1 Digital Timer | <ul style="list-style-type: none"> 1 Globe 1 Coil spring diam. 14 mm 1 Trunk, cross section 1 Experiment Guide 1 Small case |
|--|--|--|--|

5507 HOW TO SAVE ENERGY AT HOME

5507



SUPPLIED EQUIPMENT

1 Skein of thread	2 PVC rods	1 Calorimeter with thermometer	1 Bottle with tap
1 Denaturated alcohol bottle	1 Trestle stand	1 Solar power engine	1 Plastic bag
1 Linear ruler	5 Cables	1 Battery holder	1 Fan with stand
1 2000 ml graduated cylinder	1 Glass rod	1 Plexiglas plate	1 Thermometer -10 + 110°C
1 Tripod stand	1 Switch	1 Aluminium rod	1 100 ml beaker
1 Alcohol burner	1 Lamp with lamp socket	1 Faucet	1 250 ml beaker
1 Rain gauge	1 Engine-dynamo-alternator	1 Stand with hook	1 100 ml flask
6 Candles	1 Ammeter	1 Fire-spreading net	1 Experiments Guide
3 Candle holders	1 Voltmeter	1 Digital timer	1 Case
1 Plexiglas rod	2 Rags	1 100 ml graduated cylinder	

CONTENTS

1. Introduction
2. Water, a resource
3. The cycle of water
4. Water volume
5. Precipitations
6. Water counter
7. Water bill
8. Water losses
9. A water drop
10. Surprises come from numbers
11. Faucet losses
12. The toilette
13. Earning through saving
14. Electricity
15. The electrical circuit
16. The electrical instruments
17. The electric energy
18. The electric system in our houses
19. Electric dangers
20. How to obtain electric power
21. The need of saving electric power
22. The greatest energy source: the sun
23. A new energy source: good sense
24. Thermal energy
25. Combustibles
26. Energetic productivity
27. Heat propagation
28. Thermal equilibrium
29. Thermal insulation
30. Thermal system in our houses

30 EXPERIMENTS

5694 LET'S LEARN HOW TO MEASURE

5694



SUPPLIED EQUIPMENT

1 100 cm linear ruler	1 Small blackboard	1 Huorglass
1 Calliper	1 100 ml graduated cylinder	1 Dimostracion clock
1 Curvimeter	1 Sphere	1 Wall thermometer
1 1 dm ³ cubic case with 9 square plates, 9 small rulers and 10 units 100 cubes 1 cm ³ / 1 g	1 400 ml beaker	1 String
1 Aluminium solid	1 Goniometer	1 Experiment Guide
1 Set of geometric figures	1 Elementary school balance	1 Case
	1 250g spring scale	

CONTENTS

1. Qualitative and quantitative comparisons.
2. Measurable sizes
3. What it means to measure
4. Measuring units system
5. How to measure a lenght using the Direct method
6. Linear ruler
7. Faults in measuring
8. Cursor calliper.
9. The curvimeter
10. The goniometer
11. How to measure a surface.
12. The graduated cylinder
13. How to measure the volume of an irregular solid.
14. The spring scale
15. How to measure the weight of a solid
16. How to measure the weight of a liquid
17. Specific weight
18. How to measure the specific weight of a solid
19. How to measure the specific weight of a liquid
20. The thermometer
21. Air's temperature
22. Time
23. The hourglass
24. The mechanics clocks

21 EXPERIMENTS